3.0 IMPLEMENTATION GUIDANCE

All DOE sites should perform the activities outlined in the Activity Plan presented below. However, following Operations Office guidance, small DOE sites may implement those portions of the Activity Plan appropriate to the size and scope of their operations such that there is value added to the activities implemented for the costs incurred. For purposes of this plan, a small site is defined as one whose waste generation falls below the thresholds listed in Table 3.1. Operations Offices can use Table 3.1 as guidance to determine the appropriate level of implementation for each site.

3.1 Waste Minimization/Pollution Prevention Activity Plan

The 1994 Waste Minimization/Pollution Prevention Crosscut Plan set the course for implementation throughout the complex through development of an Activity Plan, which contained 18 key activities to be completed by CY 2000. This plan describes the Department's progress in implementing the 18 key activities, and sets priorities to expedite Departmental pollution prevention implementation.

Figure 3.1 shows the work breakdown structure of the Activity Plan with specific activities to support each initiative. The 18 activities are grouped into three broad areas of responsibility: policy direction, infrastructure development, and program implementation. Policy direction commits the Department to pollution prevention as the primary strategy for environmental management. Infrastructure development provides the framework for effective programs and projects. Program implementation calls for changes in processes, equipment, and operations at DOE's facilities and sites to reduce waste generation and environmental releases, or increase recycling.

A narrative description of the Activity Plan is provided in Appendix D. Further details are available in the 1994 Crosscut Plan.

3.2 Waste Minimization/Activity Plan Implementation Strategy

Although some progress was made in 1994 and 1995 to implement the 18 activities identified in Figure 3.1, it became clear that implementation priorities were needed to expedite the Department's pollution prevention progress. This plan identifies six immediate priorities, described in detail below, that will focus site and Headquarters efforts on achieving aggressive reductions in DOE waste generated and pollutants released. These immediate priorities are to be completed by FY 1998.

Table 3.1 Small Site Implementation Criteria*

Waste Type	Annual Waste Generation Thresh
Low-Level	50 cubic meters
Mixed	1 cubic meter
RCRA-Regulated	10 metric tons
TSCA-Regulated	10 metric tons

* Criteria for judging whether DOE sites are sufficiently small as to be exempt from performing activities contained in this plan.

Figure 3.1 Work Breakdown Structure of DOE's Pollution Prevention Program

This plan further separates the remaining 12 activities into 6 near-term priorities and 6 out-year activities, to be completed by FY 1999 and FY 2000, respectively (see Section 3.3).

3.2.1 Priority 1: Establish Senior Management Commitment

Strong and visible senior management commitment is necessary for a successful DOE-wide pollution prevention program. This plan encourages managers within Headquarters (Office Directors and above), Operations Offices, laboratories, and site contractor organizations to show commitment to pollution prevention by doing what is necessary to achieve the Secretarial goals shown in this plan, and implementing, where cost effective, the activities of this plan. Senior management can demonstrate its commitment to pollution prevention in the following ways: building pollution prevention into "mainline" documents, establishing clearly defined expectations and goals, establishing accountability, providing adequate resources, and overseeing initiatives and performance. Management should budget for pollution prevention activities per unit of waste generated or per full-time equivalent (FTE) employee. Senior DOE management should also extend accountability to site contractors. Prime contractors at each site should have similar pollution prevention commitments; the accomplishment of pollution prevention goals and milestones should be included in the criteria for the contractors' performance and award fees.

3.2.2 Priority 2: Set Quantitative Source Reduction and Recycling Goals

The Secretary of Energy has committed the Department to achieving the source reduction and recycling goals shown in Table 3.2 by the end of 1999.

Table 3.2 Departmental Source Reduction and Recycling Goals, Compared to the 1993 Baseline of Waste Generation

Setting quantitative source reduction and recycling goals and directing funds to achieve those goals are essential to the DOE pollution prevention program. Goals provide management with tangible targets, and a basis for measuring progress. Goals promote cooperation among sites, Operations Offices, and CSOs as managers work together to achieve a common purpose. Without goals, various entities within the sites and at Headquarters are not challenged to work together to prevent pollution.

In accordance with Executive Order 12856, the Department will achieve, by December 31, 1999, a 50 percent reduction from CY 1993 levels in total releases of EPCRA 313 toxic chemicals to the environment, and off-site transfers of such chemicals for treatment and disposal from routine operations, as reported in DOE TRI reports. This builds upon DOE's voluntary goal of reducing priority TRI chemicals 33 percent by 1997 as part of EPA's 33/50 Program. These reductions will be achieved to the maximum extent practicable through source reduction. Source reduction can be achieved through process and procedural changes and by eliminating or reducing the unnecessary acquisition of products containing toxic chemicals. One way to accomplish this is to review specifications and standards to identify opportunities to eliminate or reduce the use of toxic chemicals. Accordingly, Operations Offices should direct that each appropriate site develop a plan and goals to reduce or eliminate the unnecessary acquisition of products containing toxic chemicals.

The Department also commits to achieve, by December 31, 1999, a 50 percent reduction in radioactive, mixed, and hazardous waste generated in routine operations, based upon the 1993 baseline. These goals will be achieved through source reduction and recycling. The Department further commits to achieve a 33 percent reduction in the generation of sanitary waste through the end of 1999, based on the 1993 baseline. This goal can only be achieved through source reduction because sanitary waste generation, as reported in the Annual Report, is measured as the amount of waste that remains after recycling.

To satisfy a requirement of Executive Order 12873, the Department will purchase 100 percent of those recycled items designated by the EPA, except where the items are not available competitively at a reasonable price within a reasonable time frame, or if they do not meet appropriate performance standards. Purchasing non-recycled versions of the EPA-designated items will require written justification citing one or more of the above conditions.

Should the Department be successful in achieving its reduction goals for routine operations, DOE

Table 3.3 Projected Annual Cost Savings to be Realized by Achieving Secretarial Goals

Waste Type	Annual Avoided Waste	Preliminary Unit Costs*	Annual Savings ($millions)
Hazardous**	4,015 MT	$8,400/MT	$33.7
Low-Level Radioactive	18,450 m^3	$1,300/$m^3$	$24.0
Low-Level Mixed	3,642 m^3	$11,000/$m^3$	$40.1
Sanitary	38,666 MT	$200/MT	$7.7

* Radioactive waste costs are based on four representative sites.
** Includes RCRA-regulated, state-regulated, Pr by the Office of Pollution

would save $106 million yearly in avoided waste management costs beginning in 2000. This would be a significant efficiency gain; money that otherwise would have been spent treating and disposing of waste would then be available for mission activities. These potential savings are presented in Table 3.3. Cumulative escalated cost savings from achievement of goals over the 10-year period 1996-2005 could exceed $900 million. These cost savings, shown in Figure 3.2, assume that DOE will make uniform progress in each of the 4 years between 1996 and 1999, inclusive, to achieve its reduction targets.

As shown in Section 2.2.3, the draft 1996 BEMR suggests that current inventory and routine operations waste generation represent only 7 percent of the total waste volume that will be processed by the Department over the next 75 years. Application of pollution prevention to DOE's cleanup/stabilization programs is expected to yield significantly larger cost savings than the near-term, routine-waste-only savings shown in Figure 3.2. Studies are currently underway to determine how best to apply pollution prevention to cleanup/stabilization programs.

The Department recognizes that numerical reduction goals cannot be established for cleanup/stabilization wastes as generation of these waste volumes will continue as cleanup proceeds. Progress can instead be measured by recycling percentages achieved. Therefore, the Department's goal is to divert for recycling 33 percent, by weight, of its sanitary waste stream by the end of CY 1999. This recycling goal applies to all DOE wastes, including routine operations waste and cleanup/stabilization waste.

The Department will report annually to the Secretary, to EPA, and to the Federal Environmental Executive, progress made in achieving its TRI, source reduction, recycling, and affirmative procurement goals.

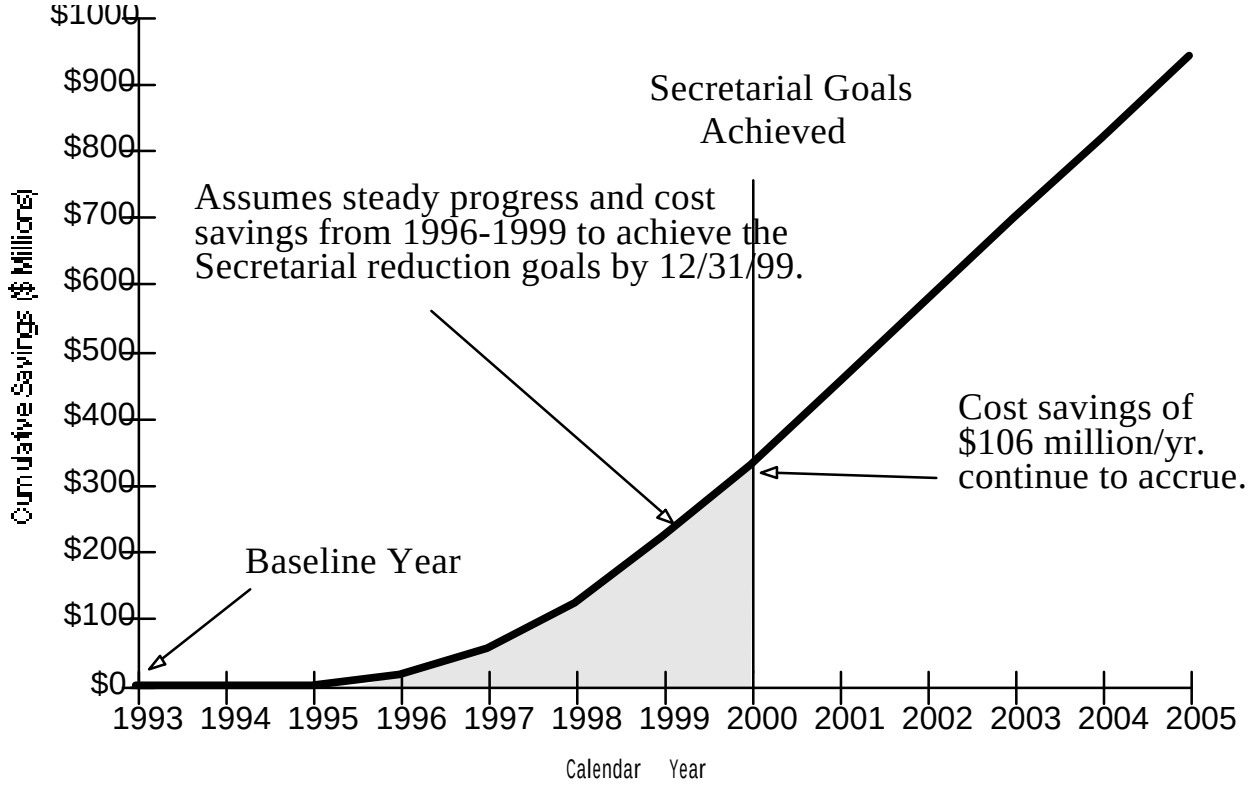

Figure 3.2 Cumulative Cost Savings to the Department from Achievement of Secretarial Goals

3.2.3 Priority 3: Institute Performance Measures

Pollution prevention performance measures provide essential feedback to management on progress made toward achieving goals. They also allow for program readjustment if progress is considered inadequate.

Departmental pollution prevention performance measures must be relevant, understandable, verifiable, and comparable. One performance measure should be to quantify the amount of pollution avoided as a result of pollution prevention activities.

The heart of the issue is how to provide a meaningful link between pollution generation data and pollution prevention activities at the sites. Pollution prevention progress based on overall changes in pollutant generation will be overestimated when a facility has reduced activity or has shut down completely, as has happened at many DOE sites. Conversely, activities such as environmental restoration, by their very nature, result in significant increases in pollutants that must be handled. Measuring individual activities and then summarizing the changes in pollutant generation due to pollution prevention, project-by-project, is the most accurate way to assess the effectiveness of the pollution prevention program.

This plan establishes two categories of pollution prevention measures that DOE laboratory and contractor sites should consider putting in place between now and FY 1998. The first involves performance measures for pollution prevention in routine operations only (Table 3.4). The second (Table 3.5) involves measures for pollution prevention in all operations (routine and cleanup/stabilization).

DOE sites already collect data for reporting against Secretarial waste reduction, recycling, and affirmative procurement goals and on Executive Board Return-On-Investment Projects. Beginning in

Table 3.4 Pollution Prevention Performance Measures Routine Waste Only

Site Performance Measures
Volume of radioactive waste reduced*
Volume of mixed waste reduced *
Weight of hazardous and sanitary waste reduced*
Weight of EPCRA 313 toxic chemical releases and off-site transfers reduced *
Weight of toxic chemical releases and off-site transfers reduced, project-by-project, due to pollution prevention activities
*Secretarial Goal

Table 3.5 Pollution Prevention Performance Measures All Operations (Routine and Cleanup/Stabilization)

Site Performance Measures
Total number of pollution prevention projects completed in the reporting year, and project-b project implementation costs, wastes avoided and savings realized
Percentage of sanitary waste recycled *
Percentage of affirmative procurement guideline materials purchased *
* Secretarial Goal

1996, sites will be requested to report these performance measures for DOE-wide collection and submittal to the Secretary in the Annual Report on Waste Generation and Waste Minimization Progress. Sites will also be requested to report costs and savings on a project-by-project basis for all site pollution prevention activities.

Using Tables 3.4 and 3.5, Headquarters and Operations Office managers can make site-by-site comparisons by normalizing (dividing) appropriate

performance measures against factors which relate to activities that directly or indirectly affect the quantity of waste being generated. The following site information should be useful in creating normalization factors:

- Total number of site employees.
- Total radioactive or hazardous waste generated at the site.
- Total projected treatment, storage, and disposal costs to manage site-generated waste.

Use of normalized comparisons, while not absolute, will establish important trends that, coupled with other site information, should allow sites to be judged relative to each other. For example, a site that budgets very little per employee on pollution prevention, and also makes very little percentile progress in reducing waste amounts, clearly must be challenged regarding its commitment to pollution prevention.

3.2.4 Priority 4: Implement Cost-Saving Pollution Prevention Projects

The main function of DOE's pollution prevention program is to reduce the generation of pollutants and increase the rate of recycling. Source reduction and recycling goals can only be achieved when pollution prevention projects are aggressively implemented. However, the implementation of such projects should proceed according to priority waste streams and economic return.

Pollution prevention projects should be implemented by the waste generating organization. Traditionally, waste generators have been reluctant to reduce the generation of pollutants from their operations, even though process improvements would reduce the overall cost of DOE operations by reducing environmental management costs.

The return-on-investment program was initiated to demonstrate the economic benefit of implementing pollution prevention projects, focusing on those with high potential for reducing operational costs. The ROI program is based upon total cost savings achieved across all DOE organizations compared to the dollars spent to implement the projects. A case study of a successful ROI project is presented in Figure 3.3.

The Department's Pollution Prevention Executive Board initiated the ROI program in 1994 and expanded it in 1995. The program is now considered sufficiently mature to be transferred to the sites for direct implementation. Sites should perform Pollution Prevention Opportunity Assessments (PPOAs) for all major waste streams and implement the most promising pollution prevention projects based on those assessments.

Various near-term funding sources for the ROI program are being evaluated as site programs are put in place. A potential funding source is the use of generator set-aside fees. Under this system, waste generators would be assessed a fee based on volume and toxicity of the pollutants generated. These fees would be used to fund the implementation of pollution prevention projects at the site where fees were collected. A pilot generator set-aside program is currently being tested at various sites reporting to the Albuquerque, Oak Ridge, and Savannah River Operations Offices.

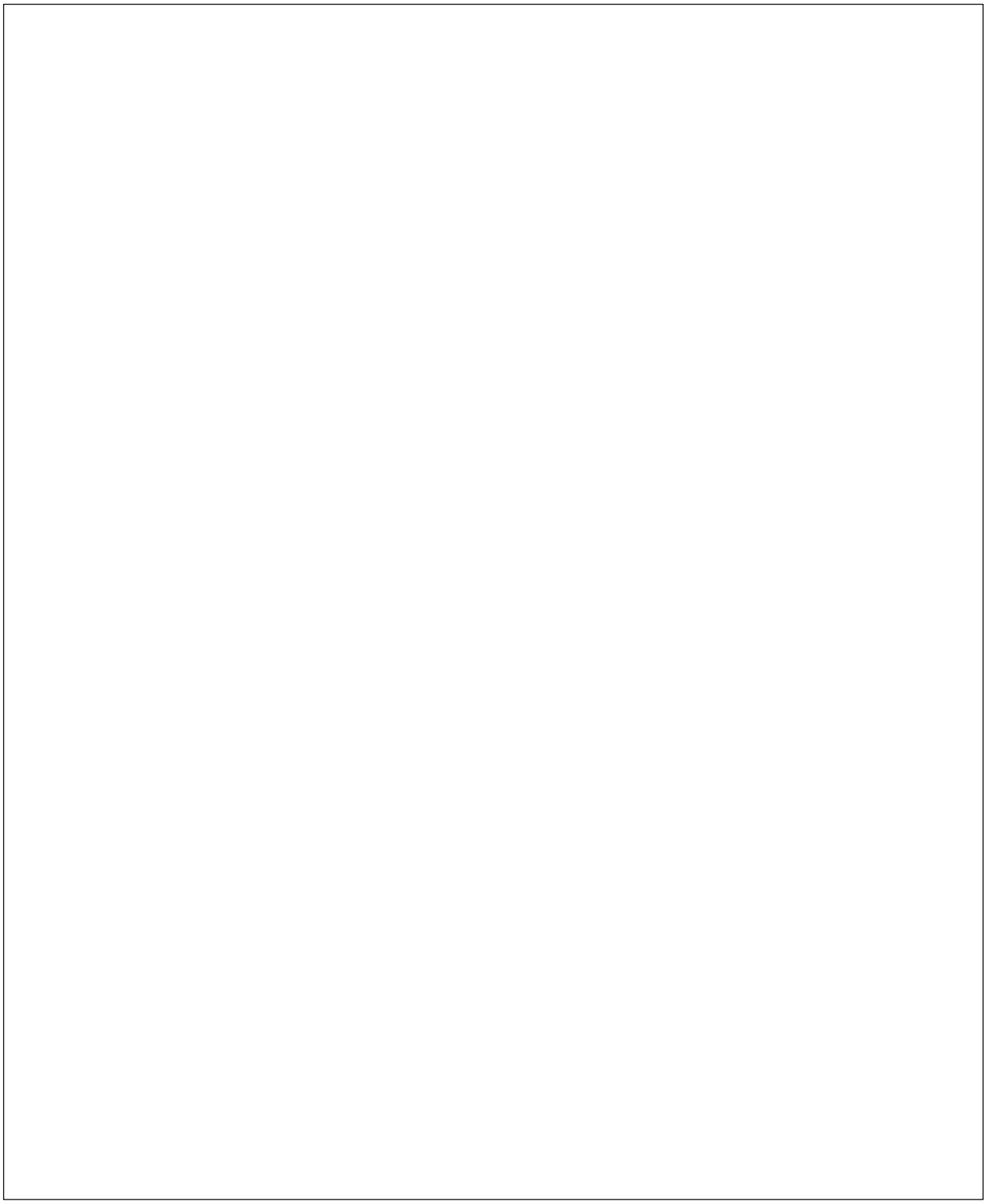

Figure 3.3. Pollution Prevention Case Study: $300,000 Investment Yields $10 Million in Savings over 10 Years.

3.2.5 Priority 5: Design Pollution Prevention into New Products, Processes, and Facilities

It is often difficult to cost effectively incorporate pollution prevention into ongoing DOE operations and activities. The most opportune time to incorporate pollution prevention is in the design phase of new products, processes, and facilities. Although it is never too late to consider preventing pollution, the earlier in design that pollution prevention is implemented, the greater the potential for benefits.

Design for pollution prevention should encompass the entire life cycle of a project. Materials used in construction and operation, energy efficiency of materials and processes, and environmental releases during operation and dismantlement should be considered. Mechanisms to implement pollution prevention in design include the use of Pollution Prevention Opportunity Assessments and "design for environment" methodologies modified to address the general design criteria for DOE projects.

The Pacific Northwest Laboratory published *A Proposed Framework for Conducting Pollution Prevention Design Assessments (P2DAs) on U.S. Department of Energy Projects* in October 1994 (PNL-10204). The proposed method is a modification of the basic PPOA approach, tailored for DOE design projects. Incorporating pollution prevention into design is a five-step process that should be applied to each design stage. The steps are:

- identify and quantify waste streams anticipated during construction, operation, and closure or dismantlement of the process or facility;
- prioritize streams, set boundaries, and establish goals for the remainder of the design assessment;
- identify pollution prevention design opportunities;
- analyze design alternatives; and
- implement selected pollution prevention design opportunities and document results.

The Pacific Northwest National Laboratory, in collaboration with other Hanford contractors, also developed a document entitled, *Design Pollution Prevention into New Products, Processes, and Facilities*; a training course entitled *An Orientation to Pollution Prevention for Facility Design*; and a software program entitled *Pollution Prevention Environmental Design Guide for Engineers (P2-EDGE)*. These tools offer an integrated approach to incorporating pollution prevention strategies into new products, processes, and facilities to reduce lifecycle costs and increase material and energy efficiency.

The above tools can be obtained via the World Wide Web at either http://w3.pnl.gov:2080/dfe/home.html. or http://epic.er.doe.gov/epic.htm.

3.2.6 Priority 6: Ensure that Programs Comply with Federal, State, and Departmental Directives

DOE managers should place a high priority on implementing the *DOE Pollution Prevention Strategy* issued by the Secretary on December 27, 1994 (see Appendix B). The Secretary's strategy addresses the implementation of Executive Order 12856 and the other Executive Orders with pollution prevention requirements.

Following are the objectives of the DOE *Pollution Prevention Strategy*. Each objective is described in detail in Appendix B.

Objective 1 Effectively institutionalize the pollution prevention ethic through training and awareness in all mission areas.

Objective 2 Reduce releases and off-site transfers of toxic chemicals to the environment.

Objective 3 Incorporate pollution prevention into the acquisition process.

Objective 4 Achieve emergency planning and community right-to-know reporting.

Objective 5 Address other environmental quality issues and pollution prevention focus areas.

Objective 6 Develop, transition, and apply innovative pollution prevention technologies.

In addition to their other compliance responsibilities, sites are encouraged to refer to the EPA's *Waste Minimization National Plan* for guidance when developing their site plans. This document identifies specific hazardous wastes as priorities for reductions; those priority wastes should be given special consideration when reduction goals are developed. This document is available from EPA's Office of Solid Waste and Emergency Response. The document number is EPA530-12-94-045, November 1994.

3.3 Implementation Status

The six priorities described earlier are part of the Activity Plan's 18 key activities that must be completed by FY 2000 for the Department to have a successful pollution prevention program. Figure 3.4 illustrates the sequence of activity implementation in order to meet that goal.

Because the 18 activities shown in Figure 3.4 are interdependent, all are necessary for a successful pollution prevention program. Sites should continue to fund programs each fiscal year on the full range of required activities. However, for purposes of budget submissions and establishing a completion schedule, this plan establishes three schedules, of 6 activities each, for aggressive implementation:

1. Immediate Priorities (FY 96-98)
   - Management commitment
   - Pollution prevention goals
   - Performance measures
   - Cost saving projects
   - New processes and facility design
   - Compliant site programs

2. Near-Term Priorities (FY 97-99)
   - Generator specific programs
   - Toxic pollutants and chemical reduction
   - Budgets based upon Activity Data Sheets
   - Pollution prevention cost/benefit analyses
   - Information exchange
   - Employee awareness

3. Out-year Activities (FY 98-2000)
   - Environmentally sound procurement
   - Research and development
   - Consistent DOE policies and orders
   - Public outreach
   - Incentives programs
   - Regulatory review/reform

For the six immediate priority activities, DOE is weakest in establishing performance measures for pollution prevention progress (Section 3.2.3) and designing pollution prevention into new facilities (Section 3.2.5).

Each Operations Office is encouraged to direct its reporting sites to plan for and implement the priorities identified in this plan, and to take corrective measures, as necessary, to ensure successful completion within allocated budgets.

Figure 3.4 Status and Priority of DOE Implementation of Pollution Prevention Activities

3.4 Site Pollution Prevention Plans

DOE Order 5400.1, "General Environmental Protection Program," requires Heads of Field Organizations to prepare plans for their pollution prevention awareness program activities. Such plans shall be reviewed annually and updated every 3 years. Plans were last submitted to Headquarters in 1994.

The guidance for preparation of the 1994 site plans, issued by the Deputy Secretary in March 1994, required the sites to set quantitative source reduction and recycling goals, estimate budgets for fiscal years 1994 through 2000, and address the key elements of the site-wide and generator-specific pollution prevention program (Appendix D, Figures D.3.1 and D.3.2). The resulting plans ranged from marginal to fully complete. In general, the larger sites had more complete plans and the smaller sites had fewer goals, budgets, and program elements.

Of greatest concern to Headquarters was the fact that when site waste reduction goals were summed across the complex, the resulting DOE-wide reductions between now and the end of 1999 were minimal, typically a few percent per year (or less) per waste type. The Secretary has set more aggressive, DOE-wide goals and requires Operations Office and site management to, as appropriate, update their plans, set stronger goals, and commit to achieve those goals. Operations Offices should review site plans for consistency with this plan and oversee required updates.

3.5 Guidance on Funding Pollution Prevention

The pollution prevention budget process is driven by the establishment of Secretarial goals and the specific priorities set forth in this document. To help achieve the goals and meet the priorities:

- Each individual site shall develop its own goals as required by DOE Order 5400.1, designed to help achieve the DOE-wide goals, and should submit those goals and appropriate ADSs to its Operations Office for review and CSO approval.

- Operations Office management should prioritize pollution prevention ADSs submitted by the sites, and work with their Headquarters CSO counterparts to ensure that budgets are formulated to achieve the Secretarial goals.

- Headquarters CSOs that generate waste are encouraged to allocate dedicated funds to reduce priority pollutants and long-term waste costs (e.g. by funding return-on-investment projects). In addition, each waste-generating CSO should identify an annual pollution prevention budget associated with site resource requirements, and should exercise due diligence to budget for, and achieve, the goals set forth in this plan.

Federal managers should pay particular attention to the growing costs of DOE's environmental cleanup/stabilization programs and to budget for cost-saving pollution prevention projects. Therefore, it is requested that all sites:

- Consider the entire life cycle of the cleanup process when considering pollution prevention actions.

- Plan for and implement pollution prevention in the cleanup process.

- Focus segregation, reuse, and recycling efforts on environmental restoration activities that will be generating low-level, hazardous, and low-level mixed wastes.

3.6 Pollution Prevention Roles and Responsibilities

Overall responsibility for the development and execution of pollution prevention implementation rests with the CSOs, the Pollution Prevention Executive Board, the Operations Office managers, and the heads of DOE laboratory and contracting organizations. Headquarters, Operations Office, and site management roles and responsibilities are summarized in Table 3.6 and explained more fully in Appendix E.

Table 3.6 Summary of DOE Roles and Responsibilities for Implementing Pollution Prevention